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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,100	08/18/2005	Yoshimitsu Miyauchi	ACH3003PIUS	1048
56744	7590	11/01/2007		
Albemarle Netherlands B.V. Patent and Trademark Department 451 Florida Street Baton Rouge, LA 70801			EXAMINER SINGH, PREM C	
			ART UNIT 1797	PAPER NUMBER
			MAIL DATE 11/01/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/517,100

Applicant(s)

MIYAUCHI ET AL.

Examiner

Prem C. Singh

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1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 01/24/2005.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 1-10 are objected to because of the following informalities:

Amendment to claims must use brackets [] and underline (---).

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Evans et al (US Patent 4,657,664).

6. With respect to claims 1, 2, and 10, Evans discloses an improved multi-stage process for the hydroconversion of heavy hydrocarbon feedstocks containing asphaltenes, metals and sulfur compounds (See Abstract). The process is characterized by the use of a demetallation catalyst in a first reaction zone followed by the use of a desulfurization catalyst in a second reaction zone (See Abstract). Evans also discloses that asphaltene is removed by demetallation catalyst and desulfurization catalyst (See column 6, lines 61-68; column 7, lines 1-3). Evans also discloses that first and second stage reactor temperature is 371-454°C (700-850°F) (See column 9, lines 33-40).

Evans further discloses that the demetallation catalyst and desulfurization catalyst can be employed in a single reactor as a dual bed or the two catalysts can be employed in separate sequential reactors, and various combinations can be employed

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to achieve flexibility of operation and product upgrade. In commercial operation, either of the basic reactor schemes described can comprise multiple parallel beds of the catalyst (See column 7, lines 24-31).

Although Evans invention does not specifically disclose a third separate catalyst zone for asphaltene removal but the invention does disclose that asphaltene is being removed by demetallation and desulfurization catalysts (See column 6, lines 61-68; column 7, lines 1-3). Evans further discloses, " An additional advantage of the process is the relatively low cost of the demetallation catalyst in comparison to the desulfurization catalyst thereby enhancing the overall economics of the process of the invention." (Column 7, lines 8-12).

Evans does not specifically disclose that the temperature in the deasphalting step is higher than the temperature in the desulfurization step, which is higher than the temperature in the demetallization step.

Evans does not specifically disclose asphaltene removal as a third step in the first reactor.

Evans does not specifically disclose a second hydroprocessing reactor with hydrodesulfurization and asphaltene removal steps.

Since Evans is disclosing the operating range of temperatures in different steps of the process, it would have been obvious to one skilled in the art at the time the invention was made to modify Evans invention and use temperatures in different steps in a range, including as claimed, for an effective hydrodemetallization, hydrodesulfurization, and asphaltene removal steps in the overall process.

Evans invention discloses removal of asphaltene in the demetallization and desulfurization steps and also discloses that demetallation catalyst is cheaper than desulfurization catalyst. Evans also adds that either of the basic reactor schemes described can comprise multiple parallel beds of the catalysts. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Evans invention and use one additional bed of demetallation catalyst for asphaltene removal as the third step in the first reactor. Also, it would have been obvious to use an additional reactor with a hydrodesulfurization catalyst bed and an asphaltene removal catalyst (demetallation) bed to achieve flexibility of operation and product upgrade.

7. With respect to claims 3 and 5, Evans discloses hydrodemetallization catalyst comprising Group VI B metals deposited on porous oxide support with surface area 150-220 m²/gm and average pore diameter of about 125 to 295 Å (12.5 to 29.5 nm) (See column 4, lines 35-38; column 8, lines 18-29). Evans also discloses hydrodesulfurization catalyst containing Group VI B and VIII metal components on a porous inorganic oxide support with surface area of 250-350 m²/gm an average pore diameter from 70 to 135 Å (7-13.5 nm) (See column 4, lines 35-38; column 9, lines 10-15).

Also, it would have been obvious to use a third bed for asphaltene removal (as discussed under claim 1) using the characteristics of hydrodemetallization catalyst as given above.

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8. With respect to claim 4, Evans discloses Group VI B metal to be 10 to 20 wt% and Group VIII metal to be from 2 to 5 wt%, both calculated as oxides and based on total catalyst weight (See column 8, lines 67-68; column 9, lines 1-3).

9. Claim 6 has all the limitations of claim 1 and further requires an additional third reactor similar to the second reactor.

Evans discloses that demetallation catalyst and desulfurization catalyst can be employed in a single reactor as a dual bed or the two catalysts can be employed in separate sequential reactors, and various combinations can be employed to achieve flexibility of operation and product upgrade. In commercial operation, either of the basic reactor schemes described can comprise multiple parallel beds of the catalyst (See column 7, lines 24-31). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Evans invention and use an additional third reactor with hydrodesulfurization catalyst bed and asphaltene removal catalyst (which is the same as hydrodemetallization catalyst, as discussed under claim 1) to achieve flexibility of operation and product upgrade.

10. Claim 7 has all the limitations of claim 6, but requires only hydrodesulfurization in third reactor.

As discussed under claim 6, it would have been obvious to one skilled in the art at the time the invention was made to modify Evans invention and use an additional

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third reactor with hydrodesulfurization catalyst bed to produce improved desulfurized product.

11. Claim 8 requires third reactor for hydrodesulfurization to be inserted between the first and the second reactors.

Evans disclosure with respect to claims 1 and 6, "Various combinations can be employed to achieve flexibility of operation and product upgrade. In commercial operation, either of the basic reactor schemes described can comprise multiple parallel beds of the catalyst (See column 7, lines 24-31)" allows the use of third reactor in between the first and second. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Evans invention and use an additional third reactor with hydrodesulfurization catalyst bed between the first and second reactors for an improved desulfurized product.

12. With respect to claim 9, Evans discloses, "Typical feedstocks that can be treated contain a substantial amount of components that boil appreciably above 1000°F (538°C) with a sulfur content of 1 to 10 wt%" (Column 5, lines 45-49). Evans further discloses Ramscarbon to be 15 to 21% (See Table III, column 11, line 20). It is known to those skilled in the art that Ramscarbon (carbon content determined by Ramsbottom method) is equivalent to Conradson carbon (carbon content determined by Conradson method).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Simpson et al (US Patent 4,431,526).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS /092507


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